File: SUB 80-KLB-004

(2 of 3)

MAX J. KUNEY COMPANY

120 N Ralph Spokane WA 99202-4744
PO Box 4008 Spokane WA 99220-0008
Phone: (509) 535-0651 Fax: (509) 534-6828

Submittal Transmittal

To:

Will Smith, P.E.
WSDOT
PO Box 12560
Yakima WA 98909-2560

Copy to: Jobsite 80

Date	
4/23/10	**80-KLB-004**
Attention	**Will Smith**
Regarding	I-90 Hyak to Snowshed Vicinity
Contract No.	7852
F.A.P. No.	State Project

WE ARE SENDING THE FOLLOWING ITEMS BY: O US MAIL O FAX O HAND DELIVERED **O E-MAIL** O FED-X

O DRAWINGS O PRINTS O PLAN O SAMPLES O SPECIFICATIONS
O COPY OF LETTER O CHANGE ORDER

COPIES	DATE	NUMBER	DESCRIPTION
			KLB – Serial Letter & **NW Cascade Soil Nail Wall QPL and Technical Submittals** **FOR APPROVAL**

THESE ARE TRANSMITTED as checked below:
- o For approval
- o For your use
- o Approved as submitted
- o Approved as noted
- o Returned for corrections
- o Resubmit _____copies for approval
- o Submit ____copies for distribution
- o Return ____corrected prints
- **o For review and comment**
- o Prints returned after loan to us
- o As requested

REMARKS

SIGNED:

Kelly Griffith - Project Manager

Hyak to Snowshed Vicinity Phase 1B – Add Lanes
Kittitas County
Special Provisions – High Capacity (Type H) and Low Capacity (Type L) Rock Bolts
Northwest Cascade, Inc.
Bid Item #'s 286 and 287

High Capacity (Type H) and Low Capacity (Type L) Rock Bolts – Table of Contents

Hyak to Snowshed Vicinity Phase 1B – Add Lanes
Kittitas County
Special Provisions – High Capacity (Type H) and Low Capacity (Type L) Rock Bolts
Northwest Cascade, Inc.

1. Drill Personnel Experience

Contractor Assigned Personnel Experience

a. Foreman
- Colby Henke
- Adam Lowers

b. Drill Operators
- Andy Ackerman
- Guy Donaldson
- Tim Williams
- Bob Bishop

* Please see the attached resumes for these individuals.

NORTHWEST CASCADE, INC.

Name and Title: Colby Henke, Project Superintendent

Anticipated Role on this Project: Superintendent/ Foreman

Years Experience: 18 Years in Geotechnical Construction Industry & 13 years of experience performing the duties proposed for this project

Education: High School Graduate

Summary of Experience and Qualifications relevant to the proposed project:

During his 18-year geotechnical construction career, Mr. Henke has participated as Foreman and Project Superintendent on several temporary/permanent earth retention systems, drilled and grouted deep foundation systems, landslide stabilization systems and various grouting applications. He has been responsible for projects ranging in value from $10,000 to $5 million. Mr. Henke has assisted in the management of several drilling related projects throughout the United States including soldier pile tieback walls, rock slope stabilization, specialty compaction and permeation grouting, drilled dam reinforcing tiedowns, seismic retrofits, and high capacity micropiles for bridge/building support.

Description of relevant projects performed in the last five years for this company:

Project:	**Rock Island Slopes Stage 2**
Location:	Wenatchee, WA
Client:	Scarsella Bros., Inc. / WSDOT
Description:	Installation of 305 rock bolts, various slope stabilization techniques and rock scaling.

Project:	**Lake Whatcom Blvd High Bridge Replacement**
Location:	Bellingham, WA
Client:	Scarsella Brothers
Description:	Installation of approx. 10,000 lf of rock bolts, soldier pile and tieback wall, rock scaling and slope stabilization.

Project:	**Johnson Driveway**
Location:	North Bend, WA
Client:	Paulsen Construction, Inc
Description:	Installation 2000 lf of vertical rock anchors and 1000 lf rock bolts.

Project:	**Burlington Hill Rock Bolts**
Location:	Burlington, WA
Client:	Grandview LLC, Inc
Description:	Design build of 5000 SF of rock slope stabilization work including rock bolts, rock dowels, micropiles and soil nail wall.

Project:	**NSC US 2 to Wandermere**
Location:	Spokane, WA
Client:	Graham Construction / WSDOT
Description:	Installation of 1200 lf rock bolts and dowels as well as 300 lf of horizontal drains.

NORTHWEST CASCADE, INC

Name and Title: Adam Lowers, Project Superintendent

Anticipated Role on this Project: Field Superintendent

Years Experience: 10 Years in Foundation Industry

Education: B.S./ 2000/ Construction Management / Central Washington University

Summary of Experience and Qualifications relevant to the proposed project:

During his 10 year foundation construction career, Mr. Lowers has participated as a Field Engineer, Scheduler, Estimator, Project Engineer, Foreman and Project Superintendent on several temporary/permanent earth retention systems, drilled and grouted deep foundation systems, rock slope stabilization projects, landslide stabilization systems and various grouting applications. He has been responsible for projects ranging in value from $10,000 to $2 million. Mr. Lowers has assisted in the management of several drilling related projects throughout the United States including soldier pile tieback walls, specialty compaction and permeation grouting, drilled dam reinforcing tiedowns, seismic retrofits, and high capacity micropiles for bridge/building support.

Description of relevant projects performed in the last five years for this company as field supervisor:

Project:	**Denny Creek Viaduct Vicinity – Slope Stabilization**
Location:	Snoqualmie, WA
Client:	WSDOT
Description:	Installation of approx. 4700 lf of rock bolts, 1200 lf of rock dowels and 2150 lf of horizontal drains.
Project:	**Rock Island Slopes Stage 2**
Location:	Wenatchee, WA
Client:	Scarsella Bros. / WSDOT
Description:	Installation and testing of 11,000 SF of soil nail/rock bolt/shotcrete retaining wall.
Project:	**Lake Whatcom Blvd High Bridge Replacement**
Location:	Bellingham, WA
Client:	Scarsella Brothers
Description:	Installation of approx. 10,000 lf of rock bolts, soldier pile and tieback wall, rock scaling and slope stabilization.
Project:	**Tolt Penstock Footing Upgrade**
Location:	Cedar River Watershed, WA
Client:	City of Seattle
Description:	Design, installation, and testing of ground anchors and micropiles for stabilization of an existing penstock footing.
Project:	**Little Falls Dam**
Location:	Reardon, WA
Client:	Avista Corporation
Description:	Installation and testing of 8 ea.1,300 kip rock anchors for dam spillway.

NORTHWEST CASCADE, INC.

Name and Title:	**Andy Ackerman, Foreman**
Anticipated Role on this Project:	Drill Operator
Years Experience:	12 Years in Foundation Industry
Education:	High School Graduate

Summary of Experience and Qualifications relevant to the proposed project:

During his 12-year foundation construction career, Mr. Ackerman has been involved in many shoring and foundation projects. Projects include micropile foundation systems, soldier pile/tieback retaining walls, soil nail/shotcrete retaining walls, rock bolts and rock anchors, and soil stabilization using compaction and permeation grouting.

Description of relevant projects performed in the last five years for this company:

Project:	**NSC US 2 to Wandermere**
Location:	Spokane, WA
Client:	Graham Construction / WSDOT
Description:	Installation of 1200 lf rock bolts and dowels as well as 300 lf of horizontal drains.
Project:	**Rock Island Slopes Stage 2**
Location:	Wenatchee, WA
Client:	Scarsella Bros., Inc. / WSDOT
Description:	Installation of 305 rock bolts, various slope stabilization techniques and rock scaling.
Project:	**Lake Whatcom Blvd High Bridge Replacement**
Location:	Bellingham, WA
Client:	Scarsella Brothers
Description:	Installation of approx. 10,000 lf of rock bolts, soldier pile and tieback wall, rock scaling and slope stabilization.
Project:	**Tunnel 15 @ Westlake**
Location:	Florence, OR
Client:	Johnson Western Gunite
Description:	Installation and testing of rock bolts for railroad tunnel collapse/ remediation.
Project:	**Going to the Sun Road**
Location:	Glacier, MT
Client:	Morgan & Osgood Construction / Federal Highway Administration
Description:	Installation and testing of 31 EA permanent rock bolts, 37 EA micropiles and various scaling. Majority of work performed from suspended platforms along cliff face.

Additional project experience is available upon request.

NORTHWEST CASCADE, INC

Name and Title: Guy Donaldson Drill Operator

Anticipated role on this project: Drill Operator

Years Experience: 5 years in the Foundation Industry.

Education: High School Graduate

Summary of Experience and Qualifications relevant to the proposed project:

During his 5 year foundation construction career, Mr. Donaldson has been involved in many shoring and foundation projects, including rock slope stabilization work, micropile foundation systems, soldier pile/ tieback retaining walls, soil nail/ shotcrete retaining walls and slope stabilization utilizing compaction and permeation grouting.

Description of relevant projects performed within the last five years for this company:

Project:	**Denny Creek Viaduct Vicinity – Slope Stabilization**
Location:	Snoqualmie, WA
Client:	WSDOT
Description:	Installation of approx. 4700 lf of rock bolts, 1200 lf of rock dowels and 2150 lf of horizontal drains.

Project:	**Johnson Driveway**
Location:	North Bend, WA
Client:	Paulsen Construction, Inc
Description:	Installation 2000 lf of vertical rock anchors and 1000 lf rock bolts.

Project:	**Link Light Rail Project, Beacon Hill Tunnel**
Location:	Seattle, WA
Client:	Obayoshi Corporation
Description:	Installation of 6700 lf of barrel vault rock anchor drilling.

NORTHWEST CASCADE, INC

Name and Title: Tim Williams, Foreman / Drill Operator

Anticipated role on this project: Foreman / Drill Operator

Years Experience: 16 years in the Foundation Industry.

Education: High School Graduate

Summary of Experience and Qualifications relevant to the proposed project:
During his 16 year geotechnical construction career, Mr. Williams has participated as a laborer, foreman and drill operator on a variety of specialty geotechnical construction projects. He has been responsible for drilling and grouting projects ranging in value from $100,000 to $1,500,000. Projects include high capacity micropiles for bridge and building support, anchored land stabilization, grout stabilization and high capacity anchored caisson walls.

Description of relevant projects performed within the last five years for this company:

Project:	**NSC US 2 to Wandermere**
Location:	Spokane, WA
Client:	Graham Construction / WSDOT
Description:	Installation of 1200 lf rock bolts and dowels as well as 300 lf of horizontal drains.

Project:	**Rock Island Slopes Stage 2**
Location:	Wenatchee, WA
Client:	Scarsella Bros. / WSDOT
Description:	Installation and testing of 11,000 SF of soil nail/rock bolt/shotcrete retaining wall.

Project:	**Lake Whatcom Blvd High Bridge Replacement**
Location:	Bellingham, WA
Client:	Scarsella Brothers
Description:	Installation of approx. 10,000 lf of rock bolts, soldier pile and tieback wall, rock scaling and slope stabilization.

NORTHWEST CASCADE, INC.

Name and Title: Robert Bishop, Foreman

Anticipated Role on this Project: Drill Operator / Foreman

Years Experience: 20 Years in Foundation Industry

Education: High School Graduate

Summary of Experience and Qualifications relevant to the proposed project:

During his 20 year foundation construction career, Mr. Bishop has been involved in many shoring and foundation projects. Projects include micropile foundation systems, soldier pile/tieback retaining walls, soil nail/shotcrete retaining walls and soil stabilization using compaction and permeation grouting.

Description of relevant projects performed in the last five years for this company:

Project:	**Going to the Sun Road**
Location:	Glacier, MT
Client:	Morgan & Oswood Construction / Federal Highway Administration
Description:	Installation and testing of 31EA permanent rock bolts and 37EA micropiles. A majority of the work was from hanging baskets along a cliff face.

Project:	**Tolt Penstock Footing Upgrade**
Location:	Cedar River Watershed, WA
Client:	City of Seattle
Description:	Design, installation, and testing of ground anchors and micropiles for stabilization of an existing penstock footing.

Project:	**SAFOMA Slide Repair**
Location:	Redmond, WA
Client:	Sammamish Forest Manor Homeowners Association
Description:	Installation of shotcrete grade beams with 80 tiebacks for slope stabilization.

Additional project experience is available upon request.

2. Proposed Construction Sequence and Schedule

Please see Kuney/ KLB submittal for complete sequencing of rock excavation and slope stabilization, as well as proposed schedule.

3. Proposed Drilling Method and Equipment

A hydraulic crawler type drill rig equipped with rotary percussive head will be used for rock bolt installation. Rock bolts will be drilled using an approximately 3.5 to 4-inch diameter bit. The rock bolts will be drilled using open hole drilling techniques when feasible, but can be cased if necessary. Compressed air will be used to exhaust the cuttings from the drill hole. Larger diameter holes may be drilled if there is caving conditions. Upon completion of drilling a rock bolts hole, the drill string will be removed and a centralized, corrosion protected rock bolt reinforcing bar will be inserted into the drilled hole. The rock bolts will then be tremie grouted with neat cement grout.

Equipment List:

Interoc AN 109 B Hydraulic Drill Rig (or equivalent).
Compressor – Sullair 900XH 900 CFM AT 350 PSIG – High pressure air compressor.
Grout Mixer/Pump – High Shear Model 7/14 w/ attached high pressure Minicol SHP160 ram pump manufactured by Drilling Technique LTD.
Cat TH103 Telehandler Forklift (or equivalent).

See the attached equipment specification sheets.

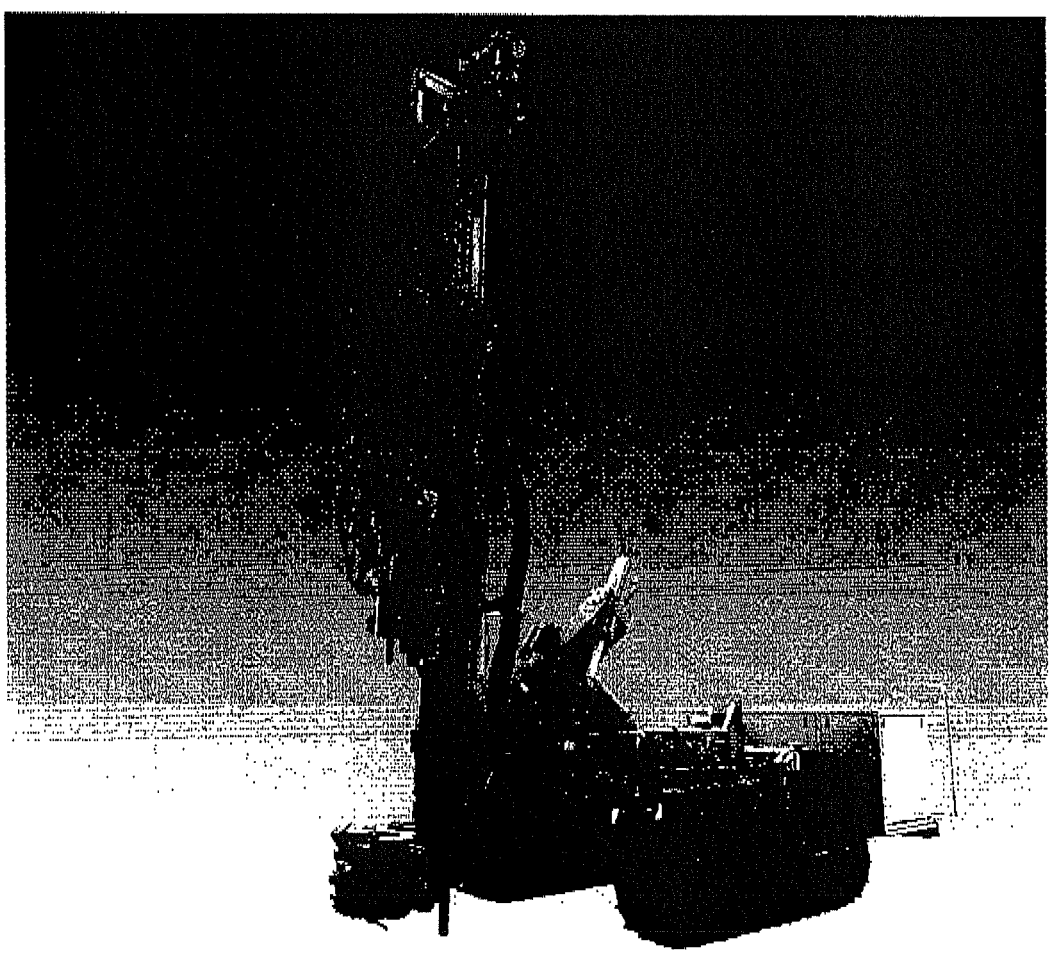
Haustenbecke 1 • 44319 Dortmund • Germany
Phone +49 (0) 231 2891 355 • Fax +49 (0) 231 2891 163
E-Mail: interoc@deilmann-haniel.de • www.dh-ms.com

Crawler drill rig AN 109 B

The crawler drill AN 109 B is a well-proven multi-purpose drill rig for anchor drilling in ground stabilization, but also intended for many other drilling applications.

The machine frame houses a robust 179 hp air-cooled Deutz Diesel engine with turbo charger. The particularly reliable hydraulics unit can run on biologically degradable oils. The high drive power output allows to drill with powerful hydraulic hammers and rotary heads with a rotation torque up to 14,752 lbf feet.

The drill mast mounted on the AN 109 B is designed for running 118.11" extension drill rods/outer casings. A rod/casing magazine allows the drill string to be fitted and removed quickly and safely. The magazine can hold as many as 6 double rod units, comprising 118.11" long sections of inner rods and outer casings up to 5.23" in diameter.



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E-Mail: interoc@deilmann-haniel.de • www.dh-ms.com

Technical data:	**Crawler drill AN 109 B**	
Drive engine	Deutz BF 6L 914 C; air-cooled	
Engine output	179	hp at 2,300 rpm
Diesel tank capacity	68.7	gal
Pump output	2 x 31.4 + 15.9 + 7.9 + 6.1 gal/min	
Max. operating pressure	4,351	psi
Hydraulic tank capacity	109.6	gal
Hydraulic fluids	mineral oils, biologically degradable oils	
Length	285	inch
Width	93	inch
Height (in parking position)	109	inch
Weight (without drill head)	25,353	lbs
Spec. ground pressure	10.3	psi
Ground clearance	14.6	inch
Pendulum range of crawlers	+15° / -15°	
Travel speed	2.18	mph
Max. traction	22,930	lbf
Mast length	263.78	inch
Feed travel (single sled)	177.17	inch
Feed travel (doublehead)	129.92	inch
Feed force	17,985	lbf
Retraction force	17,985	lbf
Feed rate	0 – 39	foot/min
Retraction rate	0 – 39	foot/min
Rapid feed	0 – 197	foot/min
Rapid retraction	0 – 197	foot/min
Recommended hydraulic drifters	B 650 R / B 1000 R / B 1500 R	
Recommended rotary heads	DK 1000 / DK 1300 / DK 2000	
Additional equipment	rod/casing magazine auxiliary winch displaceable sleds	

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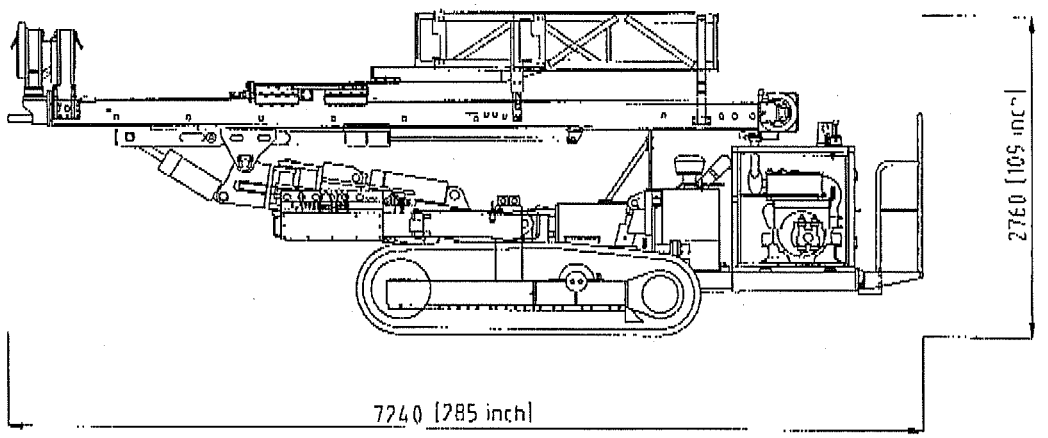
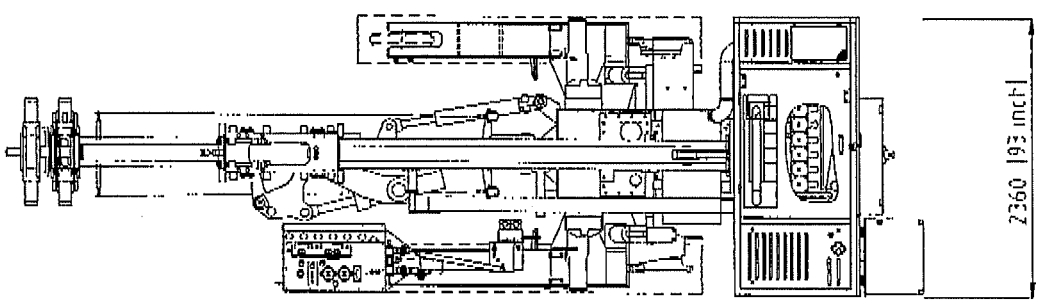




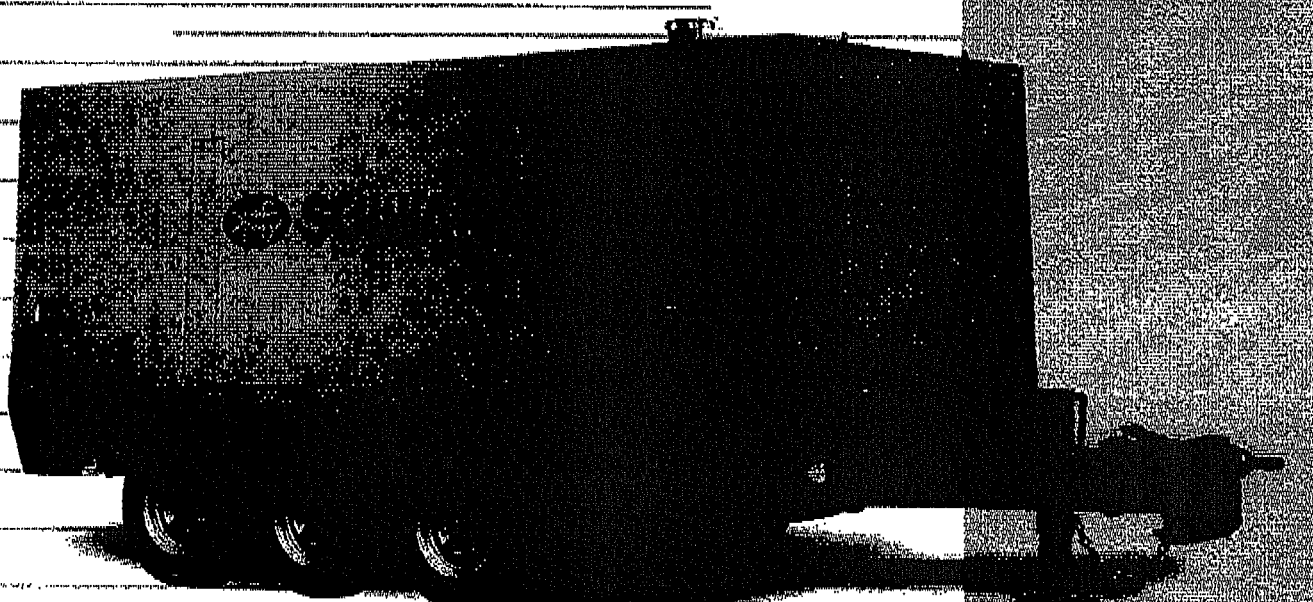
THE SULLAIR

900XH

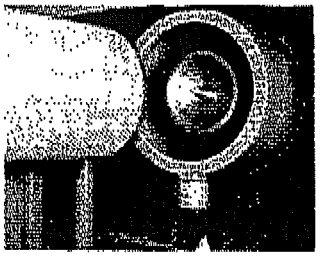
PORTABLE AIR COMPRESSOR

900 CFM AT 350 PSIG—425 L/S AT 24 BAR

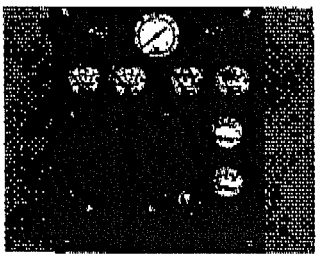
- ROTARY SCREW COMPRESSOR
- 0 TO 100% CAPACITY CONTROL
- ELECTRONIC ENGINE CONTROL
- IDLE WARM-UP VALVE
- CURRENT INSTRUMENT PANEL—
  - MECHANICAL GAUGES
  - DIAGNOSTIC SHUTDOWN INDICATORS
  - CIRCUIT BREAKERS
  - ENGINE MONITOR SYSTEM
- HIGH/LOW PRESSURE SELECTOR VALVE
- PROTECTIVE SHUTDOWN SWITCHES
- TWO-STAGE AIR FILTERS WITH SAFETY ELEMENT
- AMPLE SERVICE DOORS
- SWING-DOWN COOLER
- THREE MOUNTING OPTIONS—
  - LESS RUNNING GEAR
  - FOUR-WHEEL STEERABLE
  - TRI-AXLE—
    - SURGE HYDRAULIC BRAKES
    - MECHANICAL PARKING BRAKE
    - E-Z LUBE AXLE
- AWF COMPRESSOR FLUID



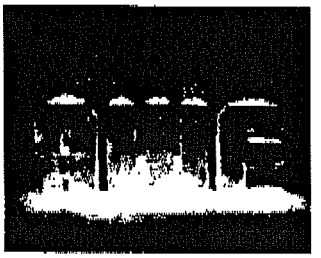
SULLAIR



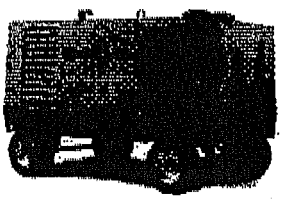
Two-Stage Air Filter with Safety Element
Provides maximum protection for engine and compressor, thereby lengthening equipment life.



Curbside Instrument Panel
Equipped with top quality gauges, circuit breaker, idle warm-up valve, diagnostic shutdown indicator system, and engine monitor system.



Sullair AWF Compressor Fluid
Improved hot and cold weather lubrication. Longer compressor fluid life. Extended air-end warranty.



Optional Four-Wheel Steerable Mounting
Improves mobility for off-road confined areas.

DESIGNED FOR TOTAL ACCESSIBILITY AND RELIABILITY

Rotary Screw Compressor

Ample Padlockable Service Doors
Large front and side doors provide access to air filters, engine, compressor and tool compartments.
Rear side service doors provide access to fuel tank, batteries and swing-down compressor fluid cooler.
Serviceable components within easy reach.
Routine maintenance is simplified.
Reduced downtime and service cost.
Service doors feature stainless hinges and steel T-type door retainers.

Three Mounting Options
Highway towable tri-axle version includes surge hydraulic brakes, mechanical parking brake, restraining tow chains and E-Z lube axle system.
Four-wheel steerable mounting and less running gear on mounting rails are also available.
All have tie down locations built into frame.

0 to 100% Capacity Control
Automatic inlet valve and unloaded starting.

Electronic Engine Control
Electronic controls include a diagnostic capability and an onboard computer that can record historical events when engine is running.
Small readout screen on the instrument panel where the diagnostic information can be obtained.

Two-Stage Dry Type Air Filters with Safety Element
Positioned to draw cool outside air.

Curbside Instrument Panel
Hinged, padlockable cover.
Mechanical gauges are used for air pressure, compressor discharge temperature, air filter maintenance indicators, and separator maintenance indicator.
Engine Monitor System will display: engine hours, engine RPM, voltage, coolant temperature, engine oil pressure, percent load, fuel rate and more.
Other instrumentation include, measured shut either start aid, fuel level gauge, circuit breakers, and engine warning and fault code lights.
High/Low pressure selector valve allows dual pressure capability without making mechanical adjustment.

Diagnostic Shutdown Indicator System
For compressor: High discharge temperature.
For engine: Low fuel level.
For additional diagnostics, by using a Caterpillar service tool that can retrieve recorded engine parameters (power, engine temperature...), the service technician can determine what the engine was doing before, during and after system malfunction.

Protective Shutdown Switches
Low engine oil pressure, high engine water temperature, low water level, high compressor temperature or low fuel level.
A protective circuit also prevents starter engagement when machine is operating.

AWF Compressor Fluid
All-weather, all-climate fluid.

Low Emission Engine Technology
Complies with Tier 3 and Stage 3 emission legislation.

Air End Warranty
2 year standard warranty.
5 year or 10,000 hour warranty when continuously serviced at the recommended intervals with Sullair AWF Compressor Fluid and filters.

Quiet Operation
Meets US EPA Sound requirements of 76dBA @ 7 meters.

Options
Many options are available.

This product is manufactured to the highest quality standards in an ISO 9001 certified quality system.

SULLAIR'S OPTIONS ALLOW YOU TO CUSTOMIZE THE COMPRESSOR TO MEET YOUR SPECIFIC REQUIREMENTS WITHOUT PAYING FOR ITEMS YOU DO NOT NEED.

Block heater | Special color paint | Service Valve | Aftercooler and Water Trap

SPECIFICATIONS, WEIGHTS AND DIMENSIONS — SULLAIR 900XH PORTABLE COMPRESSOR

Delivery @ Rated Pressure	Rated Pressure psig / bar	Pressure Range psig / bar	Designated Model	Weight (wet) lbs / kg	Length (drawbar) in / mm	Length (canopy) in / mm	Width in / mm	Height in / mm	Track Width in / mm	Tire Size (load range)
900 cfm 425 l/s 25.5 m³/min	350 24	150–350 10–24	Tri-Axle Mount	16040 7276	240 6096	179 4547	88 2235	92 2337	77 1956	9.50 x 16.5 LT (E)
			4-Wheel Mount	15710 7126	244 6198	179 4547	88 2235	99 2515	78 1981	8.25 X 15 TR (F)
			Less Running Gear	14940 6777	– –	179 4547	88 2235	83 2108	– –	– –

Engine Make	Engine Type	Engine Model	Displacement cu in / L	Cylinders	Cycles	Bore and Stroke in / mm	Rated Speed rpm	Rated Power hp / kW
Caterpillar	Diesel	C15 ATAAC	928 15.2	6	4	5.40 X 6.7 137 X 171	1800	475 354

SULLAIR.

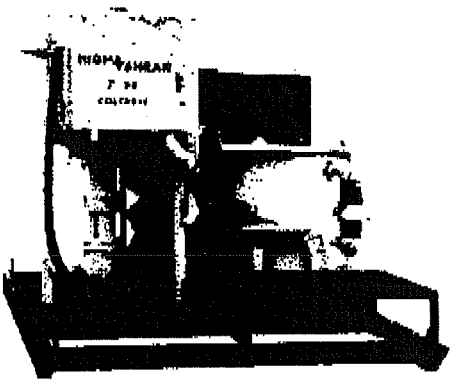
www.sullair.com

SULLAIR CORPORATION, 3700 East Michigan Blvd., Michigan City, IN 46360 Telephone: 1-800-SULLAIR or 1-219-879-5451 Fax: 1-219-874-1504
SULLAIR EUROPE, Zone des Granges, BP 82, 42602 Montbrison, Cedex, France, Telephone: (33) 4.77.96.84.70 Fax: (33) 4.77.96.84.99
SULLAIR ASIA LTD., 74 Joo Koon Circle, Jurong, Singapore 629093, Telephone: (65) 861-1211 Fax: (65) 861-2967 Telex RS25117
SULLAIR ASIA, 1 Sullair Road, Chiwan, Shenzhen, China 518068, Telephone: (86) 755-6853477 or (86) 755-6851686 Fax: (86) 755-6853473
SULLAIR TAIWAN LTD., 3F-1., No.248, Chung Shan Road, Lin-Kou Hsiang, Taipei Hsien, Telephone: (02)2601-3500, Fax: (02)2601-3032
SULLAIR ARGENTINA, Goncalves Dias 1145, 1276 Buenos Aires, Argentina, Telephone: 541-303-0621, Fax: 541-303-0626

HIGH SHEAR®

Grout Systems 7/14

GROUT MIXER/PUMP



The HighShear® 7/14 is a self-contained plant capable of colloidally mixing and pumping a wide range of grouts including sand grouts with sand/cement ratios of up to 3:1 and cement grouts with water/cement ratios down to 0.36.

PERFORMANCE ADVANTAGES

- HighShear® colloidal mixer.
- Integral agitated storage tank.
- Vertical progressive cavity pump.
- Mixer shaft assembly with cartridge seals for greater reliability.
- High capacity water measuring tank.

FEATURES

- Highly portable construction.
- Deutz Model F3L2011 diesel engine.
- Low profile design for greater stability.
- Low loading height for easier operation.
- Long-life gearbox pump drive.
- Skid chassis designed for safe handling with fork lift truck or crane.
- Low noise operation.

SPECIFICATIONS (STANDARD)

Length:	95"	Height:	79"
Width:	75"	Weight:	3,200 lbs.

Capacities

Mixer output	11.0 - 14 GPM
Pump output	20 - 31 GPM
Output pressure	200 PSI
Mixing tank capacity	22.5 gal.
Pump tank capacity	70.0 gal.
Measuring tank capacity	20.0 gal.

OPTIONS AVAILABLE

- Towable chassis with full suspension and brakes.
- Higher pumping pressures.
- Higher GPM pump output.

DTL
DRILLING TECHNIQUE

[illegible]

HIGHSHEAR

Advantages of HighShear® Grout Plants

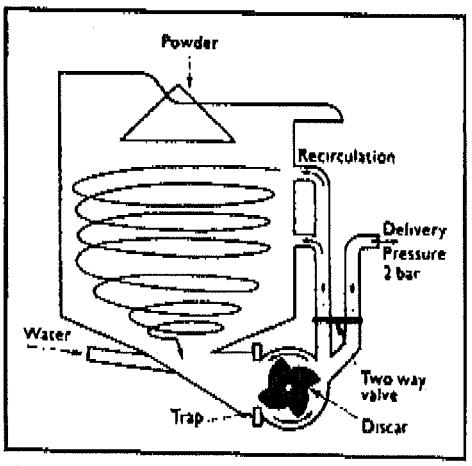
Proven Design
The HighShear® technology has been in use for over 50 years and is accepted as an industry standard worldwide.

Higher Strength
The HighShear's® mixing can mix lower water/cement ratio grout, resulting in higher set strength.

Optimum Mixing
The grout is repeatedly re-circulated through the high shearing zone within the mixer. This breaks down the clusters of dry particles and ensures maximum interspersion of fluids and solids.

Speed
The vortex action in the mixing tank swiftly assimilates the powder materials into the mix. This results in the mixing a batch in as little as 15 seconds.

Minimal Bleed
The low water/cement ratios and high efficient mixing ensures that more water is absorbed by hydration, therefore minimizing bleed.



Immiscible with Water
The properties of colloidally mixed grout render it immiscible with water, hence ideal for underwater grouting.

Minimal Dilution by Groundwater
HighShear® mixing is recommended for the grouting of anchors in water bearing ground conditions because the dilution is minimal.

Pressure Discharge
The high speed mixing action enables quick transfer of the completed grout mixture into a storage tank or to the applicaiton.

Reliability
The rugged design and readily available spare parts ensure long life and reliable service from these grout plants.

Cost Savings
HighShear® grout plants have a highly efficient mixing action and the ability to mix low water/solids ratios, allowing a reduction in the cement content for a given strength requirement.

TH103
Telehandler

CAT

Rated Capacity	4535 kg	10,000 lb
Max Lift Height	13.4 m	44 ft
Capacity at Max Height	4535 kg	10,000 lb
Max Forward Reach	8.7 m	28 ft 9 in

Cat 3054 T Engine		
Gross Power	78 kW	105 hp
Operating Weight	12,530 kg	27,623 lb
Turning Radius	3.9 m	13 ft
Frame Leveling	± 10 degrees	

Engine

Caterpillar 3054T turbocharged, watercooled, 4-stroke, 4-cylinder diesel engine.

Ratings at 2200 rpm	kW	hp
Gross Power	78	105
Net Power (SAE J1349)	75	101
Ratings at 1600 rpm	Nm	
Net Torque	365 Nm (269 ft-lb)	
Dimensions		
Bore	100mm (3.94 in)	
Stroke	127mm (5 in)	
Displacement	4.0 liter (243 in^3)	

Hydraulic System

Load-sensing, variable displacement, axial piston pump. Flow share valve for simultaneous operation of boom functions.

Single lever pilot operated joystick. Lock valves on all load holding cylinders.

System Pressure	250 bar	(3625 psi)
Max Pump Flow	142 l/min	(38 gpm)
Auxiliary Hyd Flow	71/min	(18.8 gpm)
Auxiliary Pressure	124 bar	(1800 psi)

Hydraulic Cycle Time (approx.)	
Boom Raise	16 sec
Boom Lower	13 sec
Tele Out	12 sec
Tele In	12 sec

Refill Capacities

Fuel Tank	**155 L (41 gal)**
Hydraulic Tank	**155 L (41 gal)**

Brakes

Features

- Fully enclosed oil disc brakes on both axles
- Power-assisted, foot-operated service brakes
- Selectable transmission disconnect on foot-brake operation
- Hand-operated modulating park-brake operates on front axle brake discs
- Transmission interlock on parking brake

Powertrain & Axles

All mechanical, full time all wheel drive, powershift transmission with 4 forward and 3 reverse gears.

- Outboard planetary drive axles
- Free oscillating rear axle, fixed front axle
- Front axle differential lock

Wheels & Tires

Four, equal sized wheels and tires with axle mounted, close fitting fenders.

Standard:
Construction Tread 14.00-24 16PR
Optional:
Construction Tread 17.5 R25

Standard Equipment

Standard equipment may vary. Consult your Caterpillar Dealer for specifics.

Air Cleaner, radial seal with indicator
Alternator, 55amp (12 volt)
Antifreeze (-37° F)
Auxiliary hydraulics at boom head
Back-up alarm
Battery, 12 volt, 950CCA
Differential lock (front axle)
Frame leveling ±10° with lock valve
Front mounted stabilizers
Instrumentation:
  Engine Coolant gauge
  Transmission Oil temperature gauge
  Fuel level gauge
Warning lights, 6 total
Hydraulic quick coupler
Joystick control, pilot operated
Mudguards (4)
Mirror, rear view (1), right side
Radiator dust screen
Retrieval hitch with pin
ROPS/FOPS canopy
Seat, suspension, with 3 in. retractable seat belt
Engine starting system, cold weather
Steering column tilt
Steering system, three modes
Transmission oil cooler
Transport tie-down points

Boom

Features

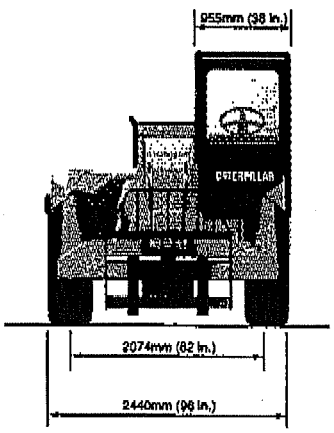
- Synchronized, three-section boom with hydraulic work tool coupler
- Non-metallic, adjustable boom wear pads
- Lock valves on all load holding cylinders
- 140° fore/aft coupler tilt range
- Selected fore/aft coupler tilt maintained hydraulically

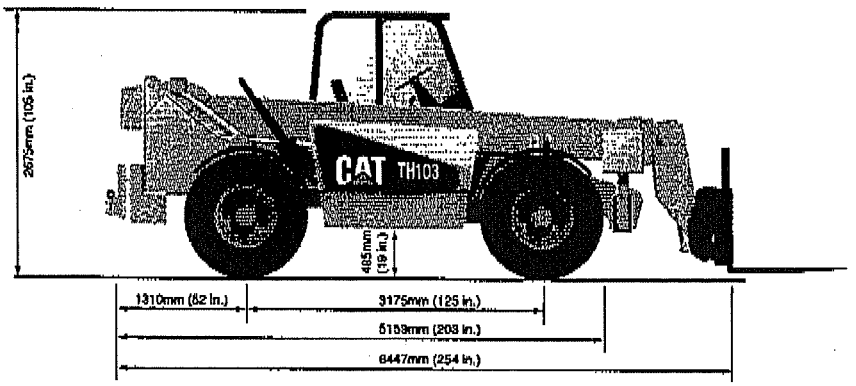
Work Tools

Choose from a wide variety of work tools designed specifically for Telehandlers.

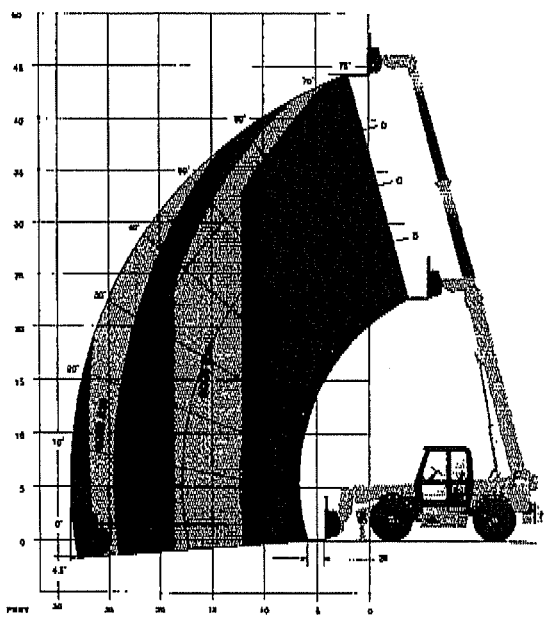
- General Purpose Bucket
- Grapple Bucket
- Light Material Bucket
- Material Handling Bucket
- Multi Purpose Bucket
- Fixed Carriages
- Rotate Carriages
- Block Forks
- Pallet Forks
- Lifting Hook
- Self Tipping Hopper
- Truss Boom
- Access Platform

Dimensions

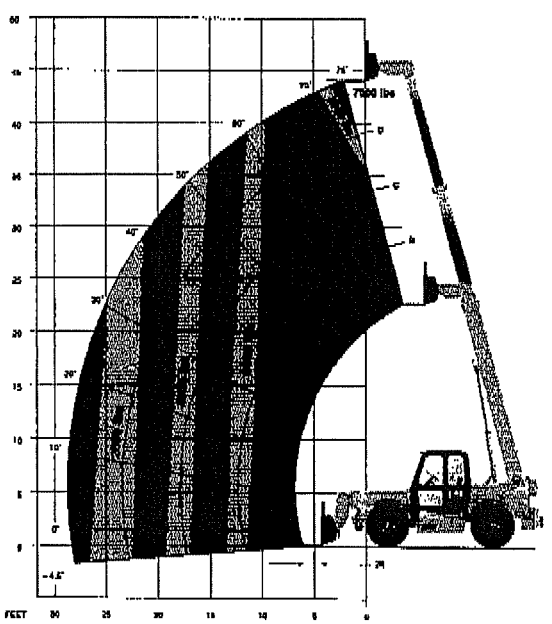




Operating Specs



Machine with stabilizers down



Machine with stabilizers up

Performance

	Stabilizers Down	Stabilizers Up
Rated Load Capacity	4535 kg (10,000 lb)	4535 kg (10,000 lb)
Maximum Lift Height	13.4 m (44 ft)	13.4 m (44 ft)
Capacity at Maximum Lift Height	4535 kg (10,000 lb)	3175 kg (7000 lb)
Maximum Forward Reach	8.7 m (28 ft 9 in)	8.7 m (28 ft 9 in)
Capacity at Maximum Reach	1360 kg (3000 lb)	1065 kg (2350 lb)

Specifications shown are for machines equipped with a 48-inch fixed carriage. Stabilizers are standard on the TH103.

Caterpillar® TH103

AEHQ9035-01 (08-00)
(Replaces AEHQ9035)

CATERPILLAR

4. Proposed Drill Hole Diameter

Rock bolt drilled holes will be approximately 3.5 to 4 inches in diameter. Hole diameters could vary depending on conditions or equipment used, but will be sized to allow for the .5" minimum grout cover over the bars.

5. Proposed Rock Bolt Anchorage Specs

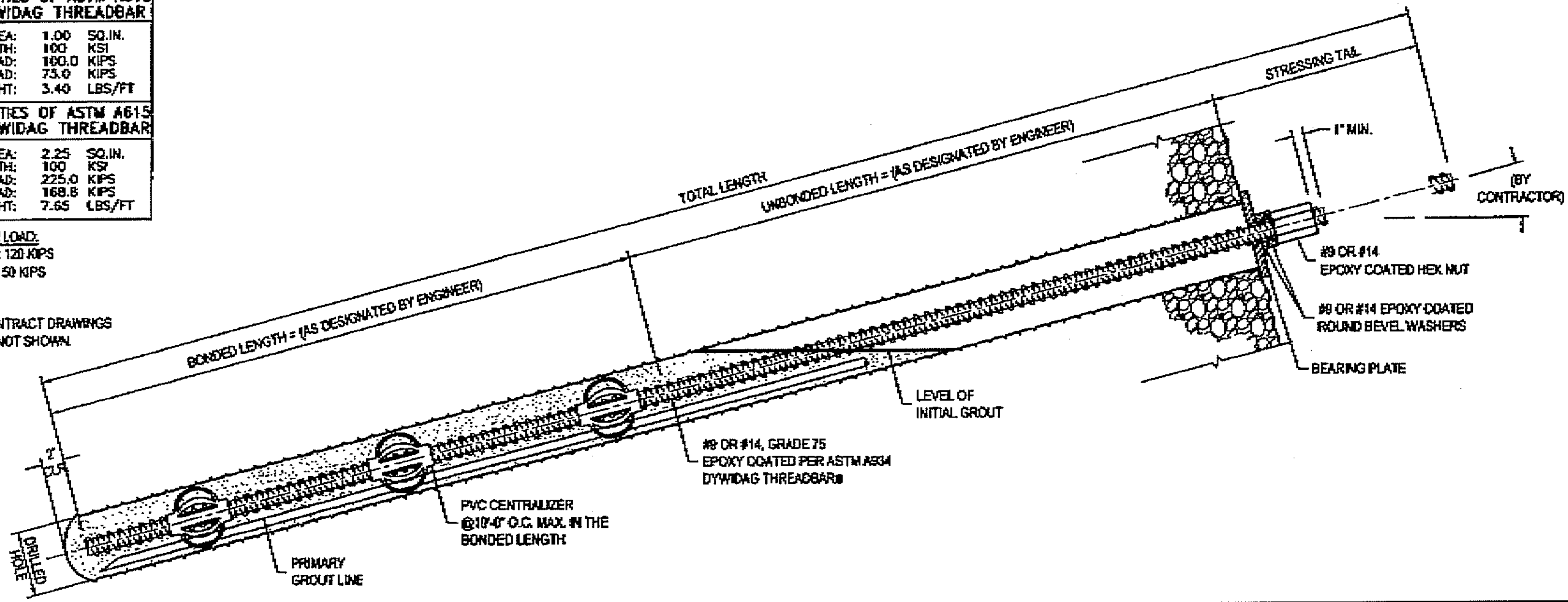
Please see attached Dywidag Rock Bolt shop drawing.

PHYSICAL PROPERTIES OF ASTM A615 #9 GR. 75 DYWIDAG THREADBAR		
EFFECTIVE AREA:	1.00	SQ.IN.
ULTIMATE STRENGTH:	100	KSI
ULTIMATE LOAD:	100.0	KIPS
YIELD LOAD:	75.0	KIPS
WEIGHT:	3.40	LBS/FT

PHYSICAL PROPERTIES OF ASTM A615 #14 GR. 75 DYWIDAG THREADBAR		
EFFECTIVE AREA:	2.25	SQ.IN.
ULTIMATE STRENGTH:	100	KSI
ULTIMATE LOAD:	225.0	KIPS
YIELD LOAD:	168.8	KIPS
WEIGHT:	7.65	LBS/FT

DESIGN LOAD:
TYPE H: 120 KIPS
TYPE L: 50 KIPS

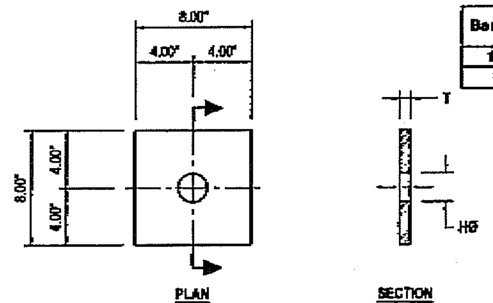
NOTE:
REFER TO CONTRACT DRAWINGS FOR DETAILS NOT SHOWN.



1 TYPICAL LONGITUDINAL SECTION

NOTE:
10"x10"x0.75" PLATE FOR WEATHERED ROCK OR WHEN BEARING ON SHOTCRETE.

MATERIAL:
ASTM A36
EPOXY COATED PER ASTM A934



Bar Size	Type	T (in)	HØ (in)
#14	High	0.75	2.00
#9	Low	0.50	1.50

2 BEARING PLATE DETAIL

REV.	DATE	ISSUE DESCRIPTION	NAME	CHKD.

DWG TITLE: ROCK BOLT ANCHOR DETAIL
DRAWN: L.BRION 04.14.10 SCALE: N.T.S.
CHKD.: A.CHEN

PROJECT: WSDOT I90 HYAK TO SNOWSHED VICINITY
LOCATION: -, WASHINGTON
CONTRACTOR: NORTHWEST CASCADE, INC.
DYWIDAG Systems International, USA, Inc.

JOB NO.: J075538
DWG NO.: G-1

6. Proposed Grout Mix Design

Three 94 lb. bags of Type I/II cement will be mixed with approximately 15 gallons of potable water and agitated in a High Shear 7/14 colloidal mixer to make a 0.45-w/c-ratio grout. This mix typically results in a compressive strength of 5,000 psi in 5 days.

Material data sheets will be forwarded as material is ordered.

7. Proposed Method for Upward Inclined Anchors

Upward inclined rock bolts follow the same drilling method as outlined above. Prior to installation of the centralized bar, a sacrificial vent tube will be attached full length to the bar. The collar/ face of the drilled hole would then be dammed up using a dry-pack cement mix that would have the tail of the bar, the attached vent tube and a grout port coming out of it. Grout would then be placed from the low end of the rock bolt using the grout port, which would displace air through the vent until no air is returning or grout returns through the vent tube. Both the grout port and vent tube would then be valved shut to prevent grout leakage.

8. Proposed corrosion Protection for Rock Bolt System

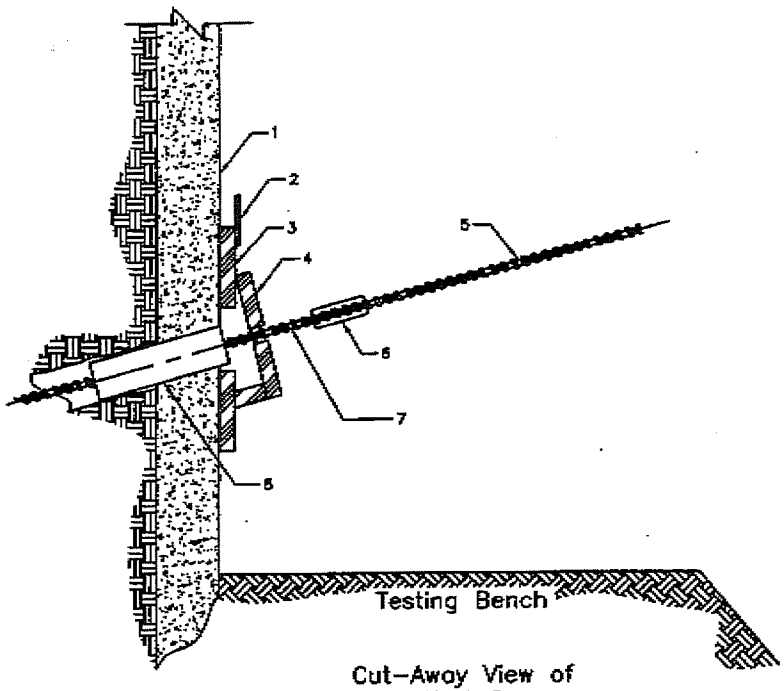
Rock bolts will be epoxy coated per the project plans and specifications.

9. Calibration Data for Stressing Rams and Gauges

Calibration data will be forwarded as an addendum to this submittal package as soon a hydraulic ram is selected and calibrated.

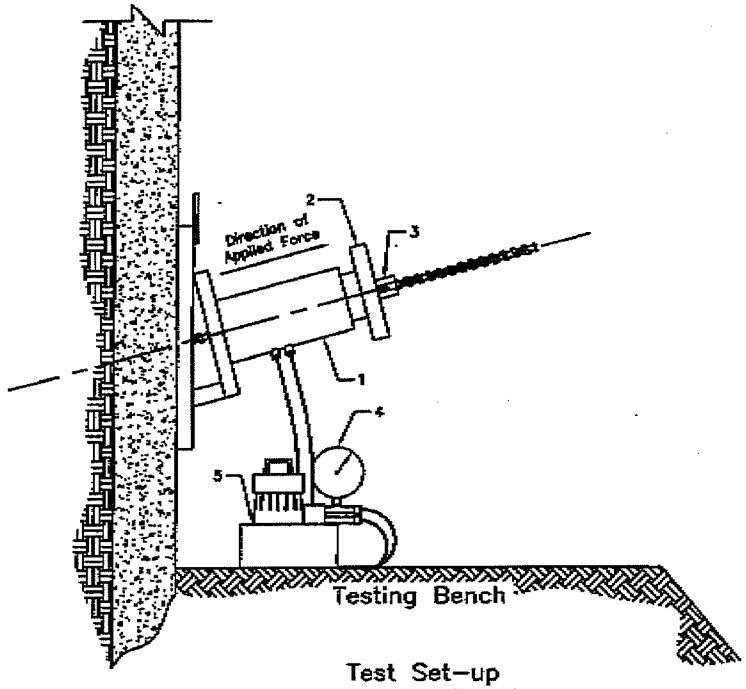
10. Proposed Rock Bolt Stressing Procedures

Rock dowels will be stressed per the project specifications with the use of a calibrated hollow-ram hydraulic jack. Please see the attached general test set-up drawing.



Cut–Away View of
Initial Test Set–up

(1) Rock face or shotcrete
(2) Lifting eye
(3) Bearing plate
(4) Shim plate (Welded to (3))
(5) Stressing tail (If necessary)
(6) Coupler (If necessary)
(7) Installed rock anchor
(8) PVC blockout



Test Set–up
Ready for Stressing

(1) Hydraulic hollow core stressing ram
(2) Bearing plate
(3) Hex nut
(4) Master pressure gauge
(5) Hydraulic pump

General Notes

No.	Revisions/Notes	Date

Northwest
Cascade Inc.
P.O. Box 73388
Puyallup, Washington 98373

Project Name and Address

Project
Title
Date
No Scale
Sheet